

## A. Scope

For a complete list of GDTs, see the Table of Contents.

Use this test method to evaluate the effectiveness of special surface coatings for concrete surfaces with two types of tests:

1. **Freeze-Thaw Test**—Use this test to determine the resistance of special surface coatings specimens to rapidly repeated cycles of freezing and thawing in the laboratory. You will use rapid freezing in air and thawing in water. This test also determines the effects of variations in the properties of the coating to the resistance of the coating in the freezing and thawing cycles specified in the procedure.
2. **Accelerated Weathering**—Use this test to determine the ability of the surface coating material to withstand weathering in an artificial weathering apparatus.

## B. Apparatus

The apparatus depends on the test used, as follows:

1. **Freeze-Thaw Test**

**Freezing and Thawing Apparatus**—Ensure the apparatus has a suitable chamber or chambers where the specimens may be frozen and thawed as specified. The apparatus must have the necessary refrigerating and heating equipment and controls to produce, continuously and automatically, reproducible cycles within the specified temperature requirements.

If the equipment is not automatic, make provisions to ensure continuous manual operation 24 hours a day or to store all specimens in a frozen condition when the equipment is not in operation.

Except for necessary supports, construct the apparatus so that each specimen is completely surrounded by air during the freezing phase of the cycle and by water during the thawing phase.

2. **Accelerated Weathering**

**Weatherometer**—Use an Atlas twin-arc weatherometer, DMC, or equivalent.

## C. Sample Size and Preparation

1. The blocks used for these tests shall be 2 x 2 x 14 in (50 x 50 x 350 mm).
2. Use a concrete mix containing 590 lbs (350 kg) of cement per cubic yard (meter) of concrete, not more than 35.9 gal (176.8 L) of water per cubic yard (meter) and 5.5 percent entrained air.
3. The mix shall produce a consistency of 3 to 4 in (75 to 100 mm) slump.
4. Trowel the surface to give a medium smooth finish.
5. Moist-cure all blocks at a minimum of 90 percent relative humidity for 14 days.
6. Dry-cure the blocks at room temperature for 14 days.
7. Prepare the surface and apply the coating according to the manufacturer's recommendation.
8. Cure the adhesive grout-coated specimens in a horizontal position at 70 ° to 77 °F (21.1 ° to 25 °C) and a relative humidity of 45 percent to 65 percent for 7 days.
9. Cure the paint-type coated specimens in a horizontal position for 7 days at a temperature of 75 ° to 79 °F (23.8 ° to 26.1 °C), followed by 4 days at 117 ° to 123 °F (47.2 ° to 50 °C).

## D. Procedures

1. **Freeze-thaw Test**

- a. Prepare the composite specimens exactly as described in the preparation of concrete blocks.
- b. Begin the freeze-thaw cycle by freezing the sample to 0 °F (-18 °C) and thawing it back to 40 °F (4.5 °C).
- c. Continue taking the sample to the two temperatures for 50 cycles or until the block fails.
- d. After each 10th cycle, examine the specimens for cracking and loss of adhesion of the coating.

2. **Accelerated Weathering**

- a. Prepare the composite specimens as described in [Sample Size and Preparation](#).

<b>Note: You may reduce the blocks to 3/4 x 3-1/2 x 6 in (19 x 89 x 150 mm).</b>
--

- b. Bond aluminum panels to the backs of test blocks with an epoxy adhesive. The panels will help mount the blocks in the weathering apparatus.
- c. Subject the material to the specified hours of exposure in a twin-arc weatherometer at an operating temperature of 145 °, ± 5 °F (63 °, ± 3 °C).
- d. Run the test at 2-hour cycles consisting of 102 minutes of light and 18 minutes of water spray plus light.
- e. Operate the apparatus 5 days each week. Do not disturb the test specimens during the remaining 2 days of the week.
- f. At the end of the exposure, examine the specimens for cracking or loss of adhesion of the coating.

## E. Calculations

No calculations are required for this test.

## F. Report

Submit certified test reports of material to the Office of Materials and Research in Forest Park, Georgia.